

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-07T18:57:36.580
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3412524316093131904
 2Mass ID (if available) : 04594069+2244418

Uranus 2029-12-07T18:57:36 K13.69 G17.17 PgtRgt

ICRS Star Coord at Epoch: 04h 59m 40.71051s +22:44:41.65391s

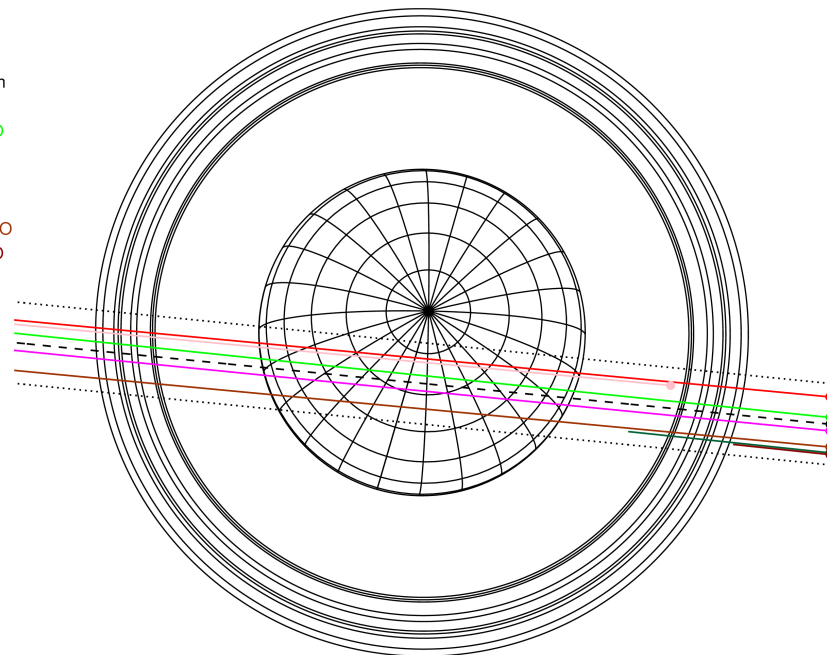
RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.693
 G magnitude : 17.168
 RP magnitude : 16.113
 BP magnitude : 18.330
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.47
 Sun-Target sep (deg) : 179.43
 Sun-Moon sep (deg) : 150.95
 B (ring opening deg) : 82.10
 PA of pole (deg) : -17.04

Uranus 2029-12-07T18:57:36 K13.69 G17.17
 PgtRgt



2029-12-07T18:57:36.5800 ra: 04 59 40.7105 s: +22 44 41.654 C/A 0.594" PA 354.29 deg v_sky -23.47 km/s D 18.24 AU
 Credit: Styled after SORA/Lucky Star

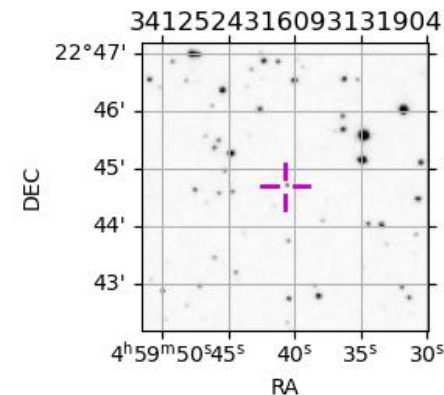
Earth
 PIC
 PMO
 TEN
 KAV
 AAT
 SAAO
 MSO



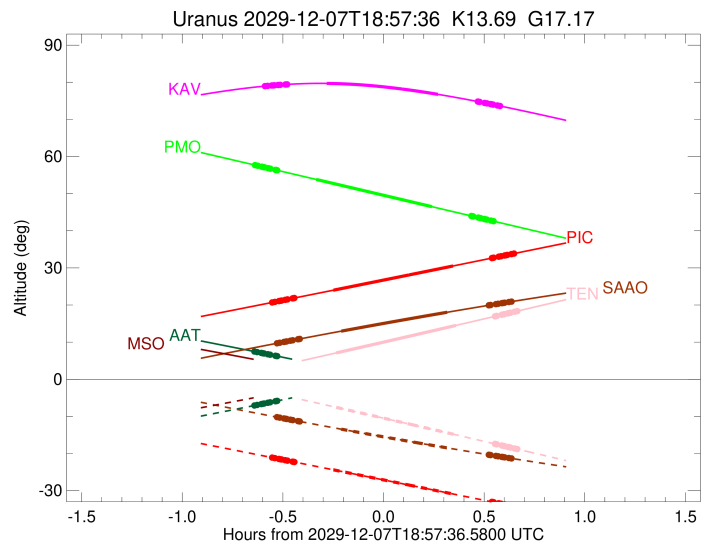
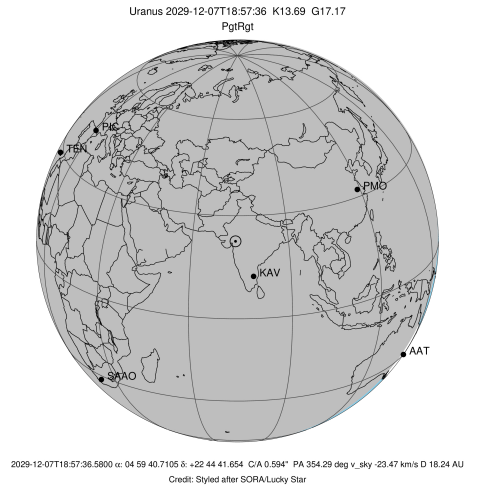
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	DEC 07 18:24 - DEC 07 19:36	PieRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	DEC 07 18:19 - DEC 07 19:30	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5		+ +	+++++	DEC 07 18:43 - DEC 07 19:37	PieRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	DEC 07 18:22 - DEC 07 19:32	PieRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++			DEC 07 18:18 - DEC 07 18:25	PnnRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+ +	+++++	DEC 07 18:25 - DEC 07 19:35	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

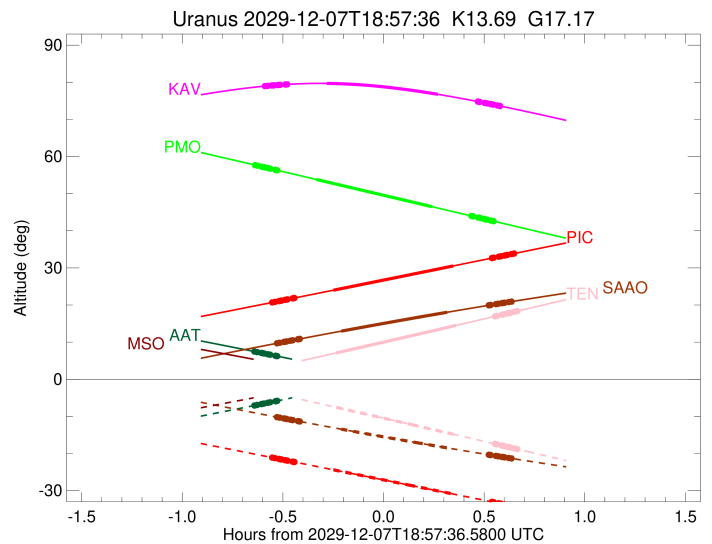
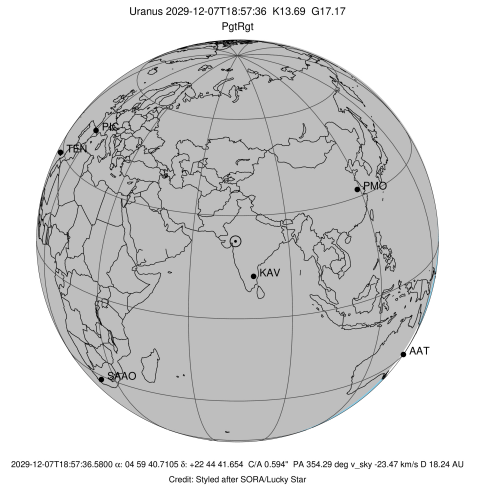


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-07T19:00:31.390
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3412524316093131904
 2Mass ID (if available) : 04594069+2244418
 ICRS Star Coord at Epoch: 04h 59m 40.71051s +22:44:41.65391s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.693
 G magnitude : 17.168
 RP magnitude : 16.113
 BP magnitude : 18.330
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.47
 Sun-Target sep (deg) : 179.43
 Sun-Moon sep (deg) : 151.75
 B (ring opening deg) : 82.10
 PA of pole (deg) : -17.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.306
 C/A sky separation (km) : 4048.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-12-07T18:24:09.977		20.65	-21.05	51502.65	-23.42		
lambda	I	2029-12-07T18:25:12.977		20.84	-21.24	50026.71	-23.43		
delta	I	2029-12-07T18:26:26.679		21.06	-21.46	48300.35	-23.42		
gamma	I	2029-12-07T18:26:55.608		21.15	-21.55	47622.83	-23.42		
eta	I	2029-12-07T18:27:14.683		21.21	-21.61	47176.12	-23.42		
beta	I	2029-12-07T18:28:18.987		21.40	-21.80	45670.43	-23.41		
alpha	I	2029-12-07T18:29:00.788		21.52	-21.93	44691.79	-23.41		
4	I	2029-12-07T18:30:29.736		21.79	-22.19	42609.86	-23.40		
5	I	2029-12-07T18:30:42.429		21.83	-22.23	42313.31	-23.40		
6	I	2029-12-07T18:31:00.931		21.89	-22.29	41879.73	-23.40		
Uranus	I	2029-12-07T18:42:39.398		23.99	-24.39	25557.83		0.35	0.37
Uranus	E	2029-12-07T19:18:19.053		30.51	-30.90	25484.37		-2.80	-2.93
6	E	2029-12-07T19:29:53.763		32.64	-33.02	41795.34	23.48		
5	E	2029-12-07T19:30:09.304		32.69	-33.07	42161.51	23.49		
4	E	2029-12-07T19:30:25.363		32.74	-33.12	42537.78	23.49		
alpha	E	2029-12-07T19:31:59.144		33.02	-33.40	44741.03	23.50		
beta	E	2029-12-07T19:32:38.040		33.14	-33.52	45655.14	23.51		
eta	E	2029-12-07T19:33:42.743		33.34	-33.72	47176.12	23.51		
gamma	E	2029-12-07T19:34:02.060		33.40	-33.78	47630.34	23.52		
delta	E	2029-12-07T19:34:30.550		33.49	-33.87	48300.35	23.52		
lambda	E	2029-12-07T19:35:43.942		33.71	-34.09	50026.71	23.53		
epsilon	E	2029-12-07T19:36:15.451		33.81	-34.19	50768.06	23.52		

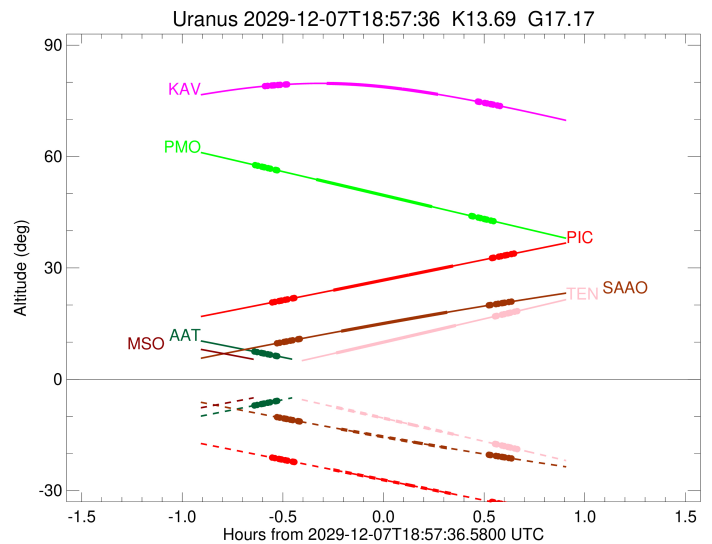
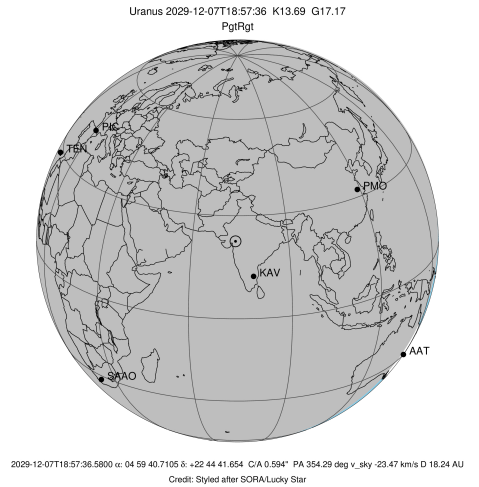
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-07T18:54:51.570
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3412524316093131904
 2Mass ID (if available) : 04594069+2244418
 ICRS Star Coord at Epoch: 04h 59m 40.71051s +22:44:41.65391s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.693
 G magnitude : 17.168
 RP magnitude : 16.113
 BP magnitude : 18.330
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.47
 Sun-Target sep (deg) : 179.43
 Sun-Moon sep (deg) : 150.79
 B (ring opening deg) : 82.10
 PA of pole (deg) : -17.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.507
 C/A sky separation (km) : 6703.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

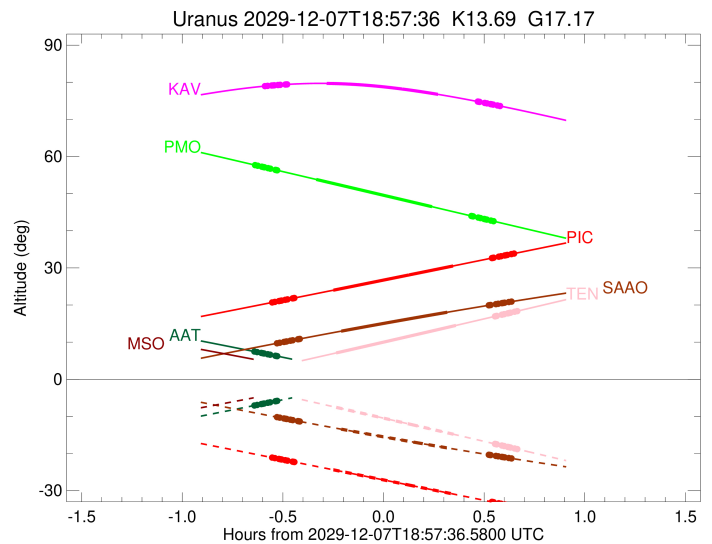
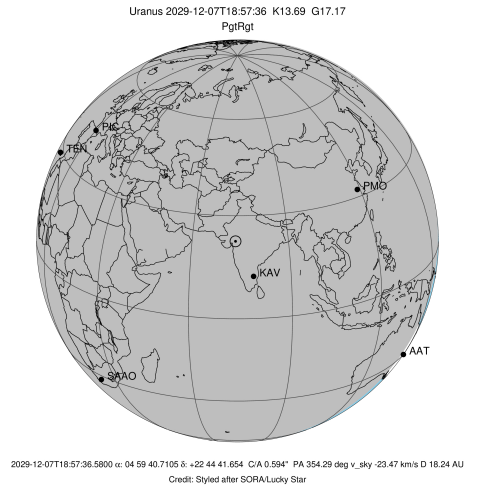
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-12-07T18:19:05.238		57.74	-57.16	51489.73	-23.58		
lambda	I	2029-12-07T18:20:07.269		57.52	-56.94	50026.71	-23.58		
delta	I	2029-12-07T18:21:20.515		57.26	-56.69	48300.35	-23.56		
gamma	I	2029-12-07T18:21:49.264		57.16	-56.58	47623.10	-23.55		
eta	I	2029-12-07T18:22:08.244		57.10	-56.52	47176.12	-23.55		
beta	I	2029-12-07T18:23:12.159		56.87	-56.29	45671.61	-23.53		
alpha	I	2029-12-07T18:23:53.870		56.72	-56.15	44690.41	-23.52		
4	I	2029-12-07T18:25:22.325		56.41	-55.84	42611.47	-23.49		
5	I	2029-12-07T18:25:34.983		56.37	-55.79	42314.38	-23.48		
6	I	2029-12-07T18:25:53.493		56.30	-55.73	41879.53	-23.48		
Uranus	I	2029-12-07T18:37:34.011		53.83	-53.26	25556.02		-0.56	-0.58
Uranus	E	2029-12-07T19:12:05.022		46.49	-45.94	25442.23		-3.50	-3.67
6	E	2029-12-07T19:23:46.432		44.00	-43.46	41795.79	23.41		
5	E	2029-12-07T19:24:02.079		43.94	-43.41	42163.37	23.42		
4	E	2029-12-07T19:24:18.179		43.89	-43.35	42539.49	23.42		
alpha	E	2029-12-07T19:25:52.067		43.55	-43.02	44739.71	23.45		
beta	E	2029-12-07T19:26:31.144		43.41	-42.88	45656.10	23.46		
eta	E	2029-12-07T19:27:35.924		43.18	-42.65	47176.12	23.47		
gamma	E	2029-12-07T19:27:55.279		43.12	-42.58	47630.50	23.48		
delta	E	2029-12-07T19:28:23.805		43.02	-42.48	48300.35	23.48		
lambda	E	2029-12-07T19:29:37.291		42.75	-42.22	50026.71	23.50		
epsilon	E	2029-12-07T19:30:08.592		42.64	-42.11	50762.39	23.50		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-07T19:01:22.370
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 3412524316093131904
 2Mass ID (if available) : 04594069+2244418
 ICRS Star Coord at Epoch: 04h 59m 40.71051s +22:44:41.65391s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.693
 G magnitude : 17.168
 RP magnitude : 16.113
 BP magnitude : 18.330
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.47
 Sun-Target sep (deg) : 179.43
 Sun-Moon sep (deg) : 151.78
 B (ring opening deg) : 82.10
 PA of pole (deg) : -17.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.351
 C/A sky separation (km) : 4640.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



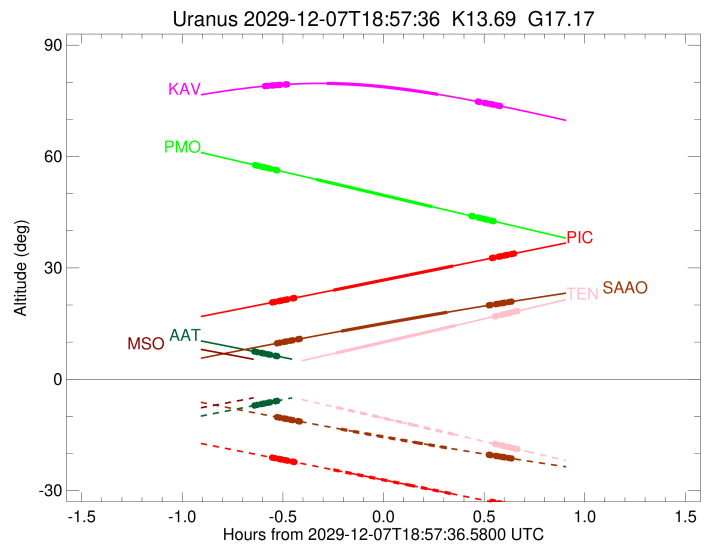
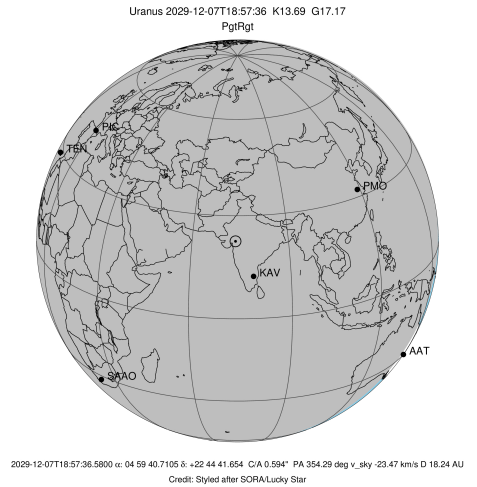
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-12-07T18:24:53.396		3.31x	-3.78x	51500.46	-23.29		
lambda	I	2029-12-07T18:25:56.662		3.52x	-3.99x	50026.71	-23.29		
delta	I	2029-12-07T18:27:10.789		3.77x	-4.24x	48300.35	-23.29		
gamma	I	2029-12-07T18:27:39.884		3.87x	-4.34x	47622.88	-23.28		
eta	I	2029-12-07T18:27:59.072		3.93x	-4.41x	47176.12	-23.28		
beta	I	2029-12-07T18:29:03.745		4.15x	-4.62x	45670.65	-23.28		
alpha	I	2029-12-07T18:29:45.815		4.30x	-4.77x	44691.53	-23.27		
4	I	2029-12-07T18:31:15.274		4.60x	-5.07	42610.17	-23.26		
5	I	2029-12-07T18:31:28.046		4.64x	-5.11	42313.54	-23.26		
6	I	2029-12-07T18:31:46.674		4.70x	-5.17	41879.71	-23.26		
Uranus	I	2029-12-07T18:43:30.070		7.09	-7.56	25558.72		0.17	0.18
Uranus	E	2029-12-07T19:19:09.568		14.49	-14.96	25474.44		-2.98	-3.12
6	E	2029-12-07T19:30:48.917		16.94	-17.41	41795.45	23.36		
5	E	2029-12-07T19:31:04.555		17.00	-17.46	42162.01	23.37		
4	E	2029-12-07T19:31:20.697		17.06	-17.52	42538.25	23.37		
alpha	E	2029-12-07T19:32:54.918		17.39	-17.85	44740.66	23.38		
beta	E	2029-12-07T19:33:34.035		17.53	-17.99	45655.41	23.39		
eta	E	2029-12-07T19:34:39.042		17.76	-18.22	47176.12	23.40		
gamma	E	2029-12-07T19:34:58.454		17.82	-18.28	47630.39	23.40		
delta	E	2029-12-07T19:35:27.078		17.93	-18.38	48300.35	23.41		
lambda	E	2029-12-07T19:36:40.815		18.19	-18.64	50026.71	23.42		
epsilon	E	2029-12-07T19:37:12.396		18.30	-18.76	50766.31	23.42		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-07T18:57:19.470
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3412524316093131904
 2Mass ID (if available) : 04594069+2244418
 ICRS Star Coord at Epoch: 04h 59m 40.71051s +22:44:41.65391s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.693
 G magnitude : 17.168
 RP magnitude : 16.113
 BP magnitude : 18.330
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.47
 Sun-Target sep (deg) : 179.43
 Sun-Moon sep (deg) : 151.35
 B (ring opening deg) : 82.10
 PA of pole (deg) : -17.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.688
 C/A sky separation (km) : 9104.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



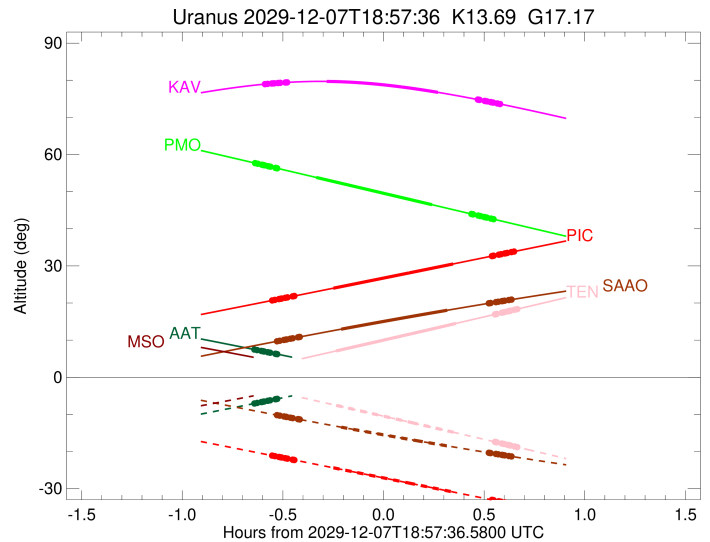
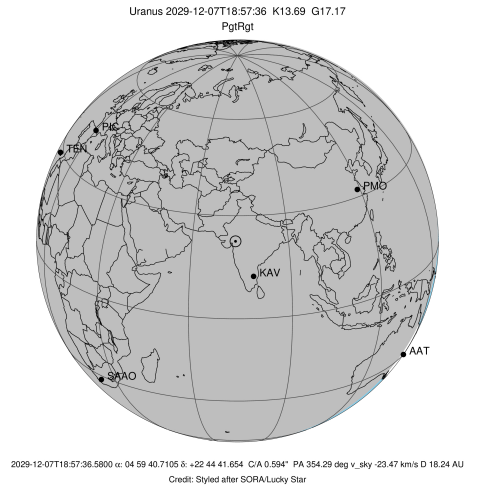
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-12-07T18:22:01.518		78.95	-79.25	51479.83	-23.51		
lambda	I	2029-12-07T18:23:03.296		79.04	-79.32	50026.71	-23.51		
delta	I	2029-12-07T18:24:16.774		79.13	-79.40	48300.35	-23.48		
gamma	I	2029-12-07T18:24:45.617		79.17	-79.43	47623.30	-23.47		
eta	I	2029-12-07T18:25:04.676		79.19	-79.45	47176.12	-23.46		
beta	I	2029-12-07T18:26:08.818		79.27	-79.52	45672.44	-23.43		
alpha	I	2029-12-07T18:26:50.796		79.31	-79.55	44689.49	-23.40		
4	I	2029-12-07T18:28:19.635		79.40	-79.62	42612.53	-23.35		
5	I	2029-12-07T18:28:32.379		79.41	-79.63	42314.90	-23.35		
6	I	2029-12-07T18:28:51.052		79.43	-79.65	41879.24	-23.33		
Uranus	I	2029-12-07T18:40:41.647		79.70	-79.75	25542.91		-1.30	-1.36
Uranus	E	2029-12-07T19:13:50.507		76.75	-76.45	25389.99		-4.22	-4.42
6	E	2029-12-07T19:25:41.684		74.81	-74.45	41796.47	23.33		
5	E	2029-12-07T19:25:57.463		74.77	-74.41	42165.78	23.34		
4	E	2029-12-07T19:26:13.600		74.72	-74.36	42541.57	23.35		
alpha	E	2029-12-07T19:27:47.576		74.44	-74.07	44738.09	23.40		
beta	E	2029-12-07T19:28:26.843		74.33	-73.95	45657.24	23.42		
eta	E	2029-12-07T19:29:31.657		74.13	-73.76	47176.12	23.45		
gamma	E	2029-12-07T19:29:51.035		74.07	-73.70	47630.67	23.46		
delta	E	2029-12-07T19:30:19.571		73.99	-73.61	48300.35	23.47		
lambda	E	2029-12-07T19:31:33.066		73.76	-73.38	50026.71	23.50		
epsilon	E	2029-12-07T19:32:04.109		73.67	-73.28	50756.52	23.51		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-07T18:54:11.860
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3412524316093131904
 2Mass ID (if available) : 04594069+2244418
 ICRS Star Coord at Epoch: 04h 59m 40.71051s +22:44:41.65391s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.693
 G magnitude : 17.168
 RP magnitude : 16.113
 BP magnitude : 18.330
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.47
 Sun-Target sep (deg) : 179.43
 Sun-Moon sep (deg) : 150.25
 B (ring opening deg) : 82.10
 PA of pole (deg) : -17.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.910
 C/A sky separation (km) : 12035.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-12-07T18:18:53.895		7.51	-7.10	51463.41	-22.95		
lambda	I	2029-12-07T18:19:56.473		7.32	-6.91	50026.71	-22.94		
delta	I	2029-12-07T18:21:11.825		7.09	-6.69	48300.35	-22.88		
gamma	I	2029-12-07T18:21:41.414		7.00	-6.60	47623.62	-22.86		
eta	I	2029-12-07T18:22:00.997		6.94	-6.54	47176.12	-22.84		
beta	I	2029-12-07T18:23:06.848		6.74	-6.34	45673.64	-22.79		
alpha	I	2029-12-07T18:23:50.129		6.61	-6.20	44688.25	-22.74		
4	I	2029-12-07T18:25:21.509		6.33	-5.93	42613.88	-22.66		
5	I	2029-12-07T18:25:34.672		6.29	-5.88	42315.24	-22.64		
6	I	2029-12-07T18:25:54.004		6.23	-5.83	41878.58	-22.61		
Uranus	I	2029-12-07T18:38:18.995		3.94x	-3.53x	25507.41		-2.32	-2.43
Uranus	E	2029-12-07T19:09:56.886		-2.08x	2.50x	25323.08		-5.00	-5.24
6	E	2029-12-07T19:22:25.763		-4.51x	4.93x	41797.36	22.53		
5	E	2029-12-07T19:22:42.194		-4.57x	4.98x	42168.58	22.55		
4	E	2029-12-07T19:22:58.866		-4.62x	5.04x	42543.86	22.57		
alpha	E	2029-12-07T19:24:35.850		-4.94x	5.35x	44736.36	22.65		
beta	E	2029-12-07T19:25:16.530		-5.07x	5.49x	45658.43	22.69		
eta	E	2029-12-07T19:26:23.350		-5.29x	5.71x	47176.12	22.74		
gamma	E	2029-12-07T19:26:43.338		-5.36x	5.77x	47630.83	22.76		
delta	E	2029-12-07T19:27:12.744		-5.45x	5.87x	48300.35	22.78		
lambda	E	2029-12-07T19:28:28.448		-5.70x	6.12x	50026.71	22.83		
epsilon	E	2029-12-07T19:29:00.192		-5.81x	6.22x	50751.71	22.84		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2029-12-07T19:00:53.100
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 3412524316093131904
 2Mass ID (if available) : 04594069+2244418
 ICRS Star Coord at Epoch: 04h 59m 40.71051s +22:44:41.65391s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 13.693
 G magnitude : 17.168
 RP magnitude : 16.113
 BP magnitude : 18.330
 DUPflag : 0
 Distance (au) : 18.240
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -23.47
 Sun-Target sep (deg) : 179.43
 Sun-Moon sep (deg) : 151.67
 B (ring opening deg) : 82.10
 PA of pole (deg) : -17.04
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.900
 C/A sky separation (km) : 11899.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ura111.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ura111.bsp
 ura161.bsp
 vgr2.ura161.bsp
 peph.ura160.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2029-12-07T18:25:38.092		9.65	-10.16	51467.13	-22.96		
lambda	I	2029-12-07T18:26:40.791		9.84	-10.34	50026.71	-22.95		
delta	I	2029-12-07T18:27:56.081		10.05	-10.56	48300.35	-22.90		
gamma	I	2029-12-07T18:28:25.643		10.14	-10.64	47623.56	-22.88		
eta	I	2029-12-07T18:28:45.202		10.19	-10.70	47176.12	-22.87		
beta	I	2029-12-07T18:29:50.985		10.38	-10.89	45673.41	-22.82		
alpha	I	2029-12-07T18:30:34.187		10.51	-11.01	44688.48	-22.78		
4	I	2029-12-07T18:32:05.443		10.77	-11.27	42613.64	-22.69		
5	I	2029-12-07T18:32:18.578		10.81	-11.31	42315.22	-22.68		
6	I	2029-12-07T18:32:37.862		10.86	-11.36	41878.73	-22.66		
Uranus	I	2029-12-07T18:45:00.144		12.96	-13.44	25513.24		-2.19	-2.29
Uranus	E	2029-12-07T19:16:35.940		18.05	-18.49	25319.74		-5.04	-5.27
6	E	2029-12-07T19:28:58.145		19.92	-20.34	41797.49	22.73		
5	E	2029-12-07T19:29:14.440		19.96	-20.38	42168.96	22.76		
4	E	2029-12-07T19:29:30.958		20.00	-20.42	42544.16	22.77		
alpha	E	2029-12-07T19:31:07.038		20.24	-20.65	44736.11	22.86		
beta	E	2029-12-07T19:31:47.364		20.34	-20.75	45658.60	22.90		
eta	E	2029-12-07T19:32:53.561		20.50	-20.91	47176.12	22.95		
gamma	E	2029-12-07T19:33:13.364		20.55	-20.96	47630.86	22.97		
delta	E	2029-12-07T19:33:42.496		20.62	-21.03	48300.35	22.99		
lambda	E	2029-12-07T19:34:57.491		20.80	-21.21	50026.71	23.05		
epsilon	E	2029-12-07T19:35:28.904		20.87	-21.28	50750.99	23.06		